JEE Main Session 2 Chemistry Exam: Model 4

1. Find out the sum of the coefficients of all the species involved in the balanced equation:
   $2MnO4 + I^- \rightarrow$ (in the presence of a slightly alkaline medium) $\rightarrow$ Product
2. Find out the maximum number of hybrid orbitals formed when 2s and 2p orbitals are mixed.
3. Find out the work done in Joules for the cyclic process ABCA such that $P_A = 30$ kPa, $V_A = 10$ dm^3, $P_B = 10$ kPa, $V_B = 30$ dm^3, $P_C = 10$ kPa, $V_C = 10$ dm^3 (as per the given graph).
4. Identify the given reaction.
   $C_6H_6–C=O–Cl \rightarrow$ (in the presence of H_2, $Pd/BaSO_4$) $\rightarrow$ Product
   i. Etard Reaction
   ii. Stephen's Reaction
   iii. Wolff Kishner Reduction
   iv. Rosenmund Reaction
5. Which of the given compounds will not give the Fehling test?
   i. Lactose
   ii. Maltose
   iii. Sucrose
   iv. Glucose
6. Which of the following sets contain both diamagnetic ions?
   i. Ni^{2+}, Cu^{2+}
   ii. Eu^{3+}, Gd^{3+}
   iii. Cu^+, Zn^{2+}
   iv. Ce^{4+}, Pm^{3+}
7. Identify the halogen which has allylic halogen. (A diagrammatic representation of compounds was given).
8. Find the final product when $C_6H_6–Br$ reacts with i. Mg, Dry Ether, ii. CO_2, H^+, iii. NH_3, heat, and iv. Br_2, KOH
9. Identify the correct structure for the compound named "3-Methylpent-2-enal" as per IUPAC nomenclature.
10. Identify the most stable compound/ion among the given options.
11. Statement I: For hydrogen atoms, 3p and 3d are degenerate.
    Statement II: Degenerate orbitals have the same energy.
    i. Both statements I and II are correct.
    ii. Both statements I and II are incorrect.
    iii. Statement I is correct and statement II is incorrect.
    iv. Statement I is incorrect and statement II is correct.
12. What is the geometry of Aluminium chloride in an aqueous solution?
    i. Square planar
    ii. Octahedral
    iii. Tetrahedral
    iv. Square pyramidal
13. The number of atoms in a silver plate having an area of 0.05 cm^2 and a thickness of 0.05 cm is m x 10^{19}. If the density of silver is 7.9 g/cm^3, find the value of m.
14. What is the group number of unununnium?
15. Match the following:
    Column I: i. BrF5, ii. H2O, iii. ClF3, iv. SF4
    Column II: a. Sea-Saw, b. T-Shape, c. Bent, d. Square Pyramidal